**WHAT IS CLAIMED IS:**

1. A method for automatic registration of film separations, the method comprising:

accessing component images that are based on digitized film separations, wherein each of the component images includes a set of gray-level pixels;

determining automatically an alignment vector for at least a part of a selected component image from among the accessed component images; and

correcting one or more film distortions by applying the alignment vector to the part of the selected component image.

2. The method of claim 1 wherein the accessed component images are based on digitized color film separations.

3. The method of claim 1 wherein accessing component images comprises digitizing film separations.

4. The method of claim 1 wherein the alignment vector aligns the part of the selected component image with a corresponding part of a second of the accessed component images, the method further comprising combining the selected component image and the second of the accessed component images after applying the alignment vector.

5. The method of claim 1 further comprising selecting one of the accessed component images as a reference, wherein determining the alignment vector comprises

determining an alignment vector between a part of the reference and the part of the selected component image.

6. The method of claim 5 wherein a green component image is selected as the reference.

7. The method of claim 5 further comprising determining an additional alignment vector between the part of the reference and a part of an additional one of the accessed component images.

8. The method of claim 5 wherein determining the alignment vector comprises:

determining a first set of features associated with the part of the reference;

determining a second set of features associated with the part of the selected component image;

comparing the first and second sets of features based on results obtained when applying one or more candidate alignment vectors; and

determining the alignment vector based on results of the one or more comparisons.

9. The method of claim 8 wherein:

determining the first set of features comprises:

applying an edge detection filter to the part of the reference to generate a first preliminary set of edges, and

applying an edge refinement procedure to the first preliminary set of edges to obtain the first set of features; and

determining the second set of features comprises:

applying the edge detection filter to the part of the selected component image to generate a second preliminary set of edges, and

applying the edge refinement procedure to the second preliminary set of edges to obtain the second set of features.

10. The method of claim 8 wherein comparing the sets of features based on results obtained when applying one or more candidate alignment vectors comprises:

assigning a non-zero amount of distortion to a pixel in a first of the accessed component images only if the pixel is part of a feature and if a pixel at a corresponding location in a second of the accessed component images is not part of a feature; and

summing the distortion values obtained for a predefined set of pixels in an area being examined in the first component image.

11. The method of claim 10 wherein the first of the accessed component images is the selected component image.

12. The method of claim 9 wherein applying the edge refinement procedure comprises selecting edges based on a characteristic of at least one of the accessed component images.

13. The method of claim 12 wherein the characteristic comprises high intensity.

14. The method of claim 9 wherein applying the edge refinement procedure comprises:

identifying a connected edge within an area under consideration;

including the connected edge in a set of selected edges if the connected edge meets a first criterion of merit; and

obtaining a set of features based on whether the entire set of selected edges satisfies a second criterion of merit.

15. The method of claim 14 wherein:

the connected edge meets the first criterion of merit if the connected edge has at least a predetermined amount of information in one direction, and

the set of selected edges satisfies the second criterion of merit if the entire set of selected edges has at least a predetermined amount of information.

16. The method of claim 8 wherein comparing the sets of features based on results obtained when applying one or more candidate alignment vectors comprises:

selecting an initial candidate alignment vector; and

varying the initial candidate alignment vector so as to represent multiple relative displacement possibilities within a particular proximity window of the initial candidate alignment vector.

17. The method of claim 16 wherein selecting the initial candidate alignment vector comprises:

determining a first set of features associated with a center part of the reference;

determining a second set of features associated with a center part of the selected component image;

comparing the first and second sets of features associated with the center parts of the reference and the selected component image; and

selecting the initial candidate alignment vector based on results of the comparison of the center portions.

18. The method of claim 8 wherein determining the alignment vector comprises:

dividing the selected component image into a set of areas;

determining an initial alignment vector for a particular area based on at least one previously determined alignment vector for another area; and

determining the alignment vector for the particular area based on the initial alignment vector for the particular area.

19. The method of claim 18 wherein determining the initial alignment vector comprises determining the initial alignment vector for a particular area based on at least one previously determined alignment vector for a neighboring area, where a neighboring area is defined as an area that shares a common border or at least one pixel with the particular area.

20. The method of claim 19 wherein determining the initial alignment vector comprises determining the initial alignment vector for a particular area based on at least one previously determined alignment vector for a neighboring area, where the initial alignment vector is chosen as the previously determined alignment vector that provides a minimum distortion value for the particular area among the previously determined alignment vectors for at least two of the neighboring areas.

21. The method of claim 8 wherein determining the alignment vector comprises:

dividing the selected component image into a set of areas arranged such that a center of at least one area of the set of areas and a center of at least one other area of the set of areas are in different proximity to a center of the selected component image;

grouping the areas into multiple rings;

determining an initial alignment vector for a particular area based on at least one previously determined alignment vector for at least one neighboring area, where the neighboring area is defined as an area that shares a common border or at least one pixel with the particular area and is defined to belong to either an inner ring or to the same ring as the particular area; and

determining the alignment vector for the particular area based on the initial alignment vector for the particular area.

22. The method of claim 21 wherein determining the initial alignment vector is based on a previously determined alignment vector that provides a minimum distortion value for the particular area among previously determined alignment vectors for at least two

neighboring areas.

23. The method of claim 21 wherein determining the initial alignment vector is based on a previously determined alignment vector for an inward radial neighbor area.

24. The method of claim 18 further comprising:

applying alignment vectors to multiple areas of an accessed component image; and

applying a technique to smooth discontinuities that may result when different areas possess different alignment vectors.

25. The method of claim 24 wherein applying a technique to smooth discontinuities comprises:

defining a window of nonzero horizontal or vertical extent along a boundary of contiguous blocks;

interpolating alignment vectors obtained from each of the contiguous blocks in order to obtain a new set of alignment vectors for parts of the contiguous blocks within the window; and

applying the new set of alignment vectors to the parts of the contiguous blocks within the window.

26. A computer program for automatic registration of film separations, the computer program residing on a computer-readable medium and comprising instructions for causing a computer to perform operations including:

accessing component images that are based on digitized film separations, wherein each of the component images includes a set of gray-level pixels;

determining automatically an alignment vector for at least a part of a selected component image from among the accessed component images; and

correcting one or more film distortions by applying the alignment vector to the part of the selected component image.

27. An apparatus for automatic registration of film separations, the apparatus comprising one or more processors programmed to perform at least the following operations:

accessing component images that are based on digitized film separations, wherein each of the component images includes a set of gray-level pixels,

determining automatically an alignment vector for at least a part of a selected component image from among the accessed component images, and

correcting one or more film distortions by applying the alignment vector to the part of the selected component image.

28. A method of performing registration of digitized images, the method comprising:

selecting at least two areas from each of a first image and a second image;

determining separate transformations for the selected areas of the first image

based on a comparison of areas within the first and second images; and

applying a feathering technique within a predetermined amount of at least two neighboring areas within the selected areas in order to obtain new transformations for the predetermined areas if the transformations for the neighboring areas differ, where the new transformations are based on the separate transformations.

29. The method of claim 28 further comprising applying the determined transformations to the selected areas of the first image.

30. The method of claim 28 wherein:

the transformations for the at least two areas are represented as alignment vectors; and

applying the feathering technique comprises linearly interpolating between alignment vectors in the predetermined amount of the selected areas to obtain new alignment vectors for the predetermined amount of the areas.

31. The method of claim 28 wherein the images correspond to color film separations.

32. A computer program for performing registration of digitized images, the computer program residing on a computer-readable medium and comprising instructions for causing a computer to perform operations including:

selecting at least two areas from each of a first image and a second image;

determining separate transformations for the selected areas of the first image based on a comparison of areas within the first and second images; and

applying a feathering technique within a predetermined amount of at least two neighboring areas within the selected areas in order to obtain new transformations for the predetermined areas if the transformations for the neighboring areas differ, where the new transformations are based on the separate transformations

33. An apparatus for performing registration of digitized images, the apparatus comprising one or more processors programmed to perform at least the following operations:

selecting at least two areas from each of a first image and a second image;

determining separate transformations for the selected areas of the first image based on a comparison of areas within the first and second images; and

applying a feathering technique within a predetermined amount of at least two neighboring areas within the selected areas in order to obtain new transformations for the predetermined areas if the transformations for the neighboring areas differ, where the new transformations are based on the separate transformations.

34. A method of performing registration of digitized images, the method comprising:

dividing a selected component image into a set of areas;

grouping the areas into multiple rings; and

determining transformations for at least two areas in the set of areas in an order that begins with at least one area within an innermost ring and proceeds to at least one area within a ring other than the innermost ring.

35. The method of claim 34 wherein the set of areas are arranged such that a center of at least one area of the set of areas and a center of at least one other area of the set of areas are in different proximity to a center of the selected component image.

36. The method of claim 34 wherein determining transformations comprises:

determining an initial alignment vector for a particular area of the set of areas based on a previously determined alignment vector corresponding to at least one neighboring area, where the neighboring area is defined as an area that shares a common border or at least one pixel with the particular area and the neighboring area belongs to either an inner ring or to a same ring as the particular area; and

determining an alignment vector for the particular area based on the initial alignment vector for the particular area.

37. The method of claim 36 wherein the initial alignment vector is based on a previously determined alignment vector that provides a minimum distortion measure for the particular area among previously determined alignment vectors for at least two neighboring areas.

38. The method of claim 36 wherein the initial alignment vector is based on a

previously determined alignment vector for an inward radial neighboring area.

39. A computer program for performing registration of digitized images, the computer program residing on a computer-readable medium and comprising instructions for causing a computer to perform operations including:

dividing a selected component image into a set of areas;

grouping the areas into multiple rings; and

determining transformations for at least two areas in the set of areas in an order that begins with at least one area within an innermost ring and proceeds to at least one area within a ring other than the innermost ring.

40. An apparatus for performing registration of digitized images, the apparatus comprising one or more processors programmed to perform at least the following operations:

dividing a selected component image into a set of areas;

grouping the areas into multiple rings; and

determining transformations for at least two areas in the set of areas in an order that begins with at least one area within an innermost ring and proceeds to at least one area within a ring other than the innermost ring.

41. A method of performing registration of digitized images, the method comprising:

selecting a first area in each of a first image and a second image;

determining which pixels in the first areas of the first and second images are

feature pixels;

comparing the first areas of the first and second images by weighting (a) a comparison of feature pixels in the first area of the first image with corresponding pixels in the first area of the second image differently than (b) a comparison of non-feature pixels in the first area of the first image with corresponding pixels in the first area of the second image; and

determining a transformation for the first area of the first image based on the comparison of the first areas of the first and second images.

42. The method of claim 41 wherein the first and second images are based on digitized color film separations.

43. The method of claim 41 wherein weighting comprises accumulating a non-zero distortion only if a pixel in the first area of the first image has been classified as a feature and a corresponding pixel in the first area of the second image has not been classified as a feature.

44. The method of claim 41 wherein the features are edges.

45. The method of claim 41 wherein weighting comprises associating a weight of zero to the comparison of non-feature pixels in the first area of the first image with corresponding pixels in the first area of the second image, such that the comparison involving non-feature pixels in the first area of the first image need not be performed.

46. A computer program for performing registration of digitized images, the computer program residing on a computer-readable medium and comprising instructions for causing a computer to perform operations including:

selecting a first area in each of a first image and a second image;

determining which pixels in the first areas of the first and second images are feature pixels;

comparing the first areas of the first and second images by weighting (a) a comparison of feature pixels in the first area of the first image with corresponding pixels in the first area of the second image differently than (b) a comparison of non-feature pixels in the first area of the first image with corresponding pixels in the first area of the second image; and

determining a transformation for the first area of the first separation based on the comparison of the first areas of the first and second images.

47. An apparatus for performing registration of digitized images, the apparatus comprising one or more processors programmed to perform at least the following operations:

selecting a first area in each of a first image and a second image;

determining which pixels in the first areas of the first and second images are feature pixels;

comparing the first areas of the first and second images by weighting (a) a comparison of feature pixels in the first area of the first image with corresponding pixels in the first area of the second image differently than (b) a comparison of non-feature

pixels in the first area of the first image with corresponding pixels in the first area of the second image; and

determining a transformation for the first area of the first separation based on the comparison of the first areas of the first and second images.

48. A method of performing registration of digitized images, the method comprising:

selecting a first area in each of a first image and a second image;

determining which pixels in the first areas of the first and second images are feature pixels;

determining a transformation for the first area of the first image, the determining including:

computing distortion values using a partial distortion measure on candidate alignment vectors that are processed in a spiral search configuration, and

selecting one of the candidate alignment vectors as the transformation based on the computed distortion values.

49. The method of claim 48 wherein performing the spiral search comprises determining distortion values associated with different horizontal and vertical relative displacements of an initial alignment vector in an order characterized by increasing radial distance along a spiral scanning path.

50. The method of claim 49 wherein determining distortion values associated with different horizontal and vertical relative displacements comprises beginning at a location

associated with the initial alignment vector and proceeding along the spiral scanning path within a preset window size.

51. The method of claim 48 wherein computing distortion values using the partial distortion measure comprises:

defining a set of pixels within an area;

calculating a partial sum of distortion values associated with a candidate alignment vector using a subset of the set of pixels;

comparing the partial sum to a current minimum distortion;

excluding the candidate alignment vector as a potential choice for the transformation if the partial sum is greater than or equal to the current minimum distortion;

adding to the partial sum an additional partial sum obtained using an additional subset of the set of pixels if the partial sum is less than the current minimum distortion; and

continuing to add further additional partial sums and perform comparisons to the current minimum distortion until either the partial sum is greater than or equal to the current minimum distortion or all pixels in the set have been used.

52. A computer program for performing registration of digitized images, the computer program residing on a computer-readable medium and comprising instructions for causing a computer to perform operations including:

selecting a first area in each of a first image and a second image;

determining which pixels in the first areas of the first and second images are feature pixels;

determining a transformation for the first area of the first image, the determining including:

computing distortion values using a partial distortion measure on candidate alignment vectors that are processed in a spiral search configuration, and

selecting one of the candidate alignment vectors as the transformation based on the computed distortion values.

53. An apparatus for performing registration of digitized images, the apparatus comprising one or more processors programmed to perform at least the following operations:

selecting a first area in each of a first image and a second image;

determining which pixels in the first areas of the first and second images are feature pixels;

determining a transformation for the first area of the first, the determining including:

computing distortion values using a partial distortion measure on candidate alignment vectors that are processed in a spiral search configuration, and

selecting one of the candidate alignment vectors as the transformation based on the computed distortion values..

54. A method of performing registration of digitized images, the method comprising:

selecting a first image and a second image;

defining a first set of features and a second set of features;

determining a first alignment vector for a part of the first image based on the first set of features;

determining a second alignment vector for the part of the first image based on the second set of features, the determining comprising:

using the first alignment vector as an initial second alignment vector, and

choosing the second alignment vector for the second set of features from a set of candidate alignment vectors obtained by varying the initial second alignment vector;

modifying the first alignment vector, the modifying comprising:

using the second alignment vector as an initial first alignment vector, and

choosing the first alignment vector from a set of candidate alignment vectors obtained by varying the initial first alignment vector ; and

repeating the determining of the second alignment vector and the modifying of the first alignment vector until a particular stopping condition is met.

55. The method of claim 54 wherein the first set of features corresponds to edges in one direction and the second set of features corresponds to edges in an orthogonal direction.

56. The method of claim 54 wherein the set of candidate alignment vectors for each directional set of edges consists of alignment values that differ in only one direction.

57. The method of claim 54 wherein the set of candidate alignment vectors decreases in size each time the first and second alignment vectors are determined.

58. The method of claim 54 wherein the stopping condition is a preset number of iterations.

59. The method of claim 54 wherein the stopping condition is met when the first and second alignment vectors determined after a particular iteration is equivalent to the first and second alignment vectors after a previous iteration.

60. A computer program for performing registration of digitized images , the computer program residing on a computer-readable medium and comprising instructions for causing a computer to perform operations including:

selecting a first image and a second image;

defining a first set of features and a second set of features;

determining a first alignment vector for a part of the first image based on the first set of features;

determining a second alignment vector for the part of the first image based on the second set of features, the determining comprising:

using the first alignment vector as an initial second alignment vector, and

choosing the second alignment vector for the second set of features from a set of candidate alignment vectors obtained by varying the initial second alignment vector;

modifying the first alignment vector, the modifying comprising:

using the second alignment vector as an initial first alignment vector, and

choosing the first alignment vector from a set of candidate alignment vectors obtained by varying the initial first alignment vector; and

repeating the determining of the second alignment vector and the modifying of the first alignment vector until a particular stopping condition is met.

61. An apparatus for performing registration of digitized images, the apparatus comprising one or more processors programmed to perform at least the following operations:

selecting a first image and a second image;

defining a first set of features and a second set of features;

determining a first alignment vector for a part of the first image based on the first set of features;

determining a second alignment vector for the part of the first image based on the second set of features, the determining comprising:

using the first alignment vector as an initial second alignment vector, and

choosing the second alignment vector for the second set of features from a set of candidate alignment vectors obtained by varying the initial second alignment vector;

modifying the first alignment vector, the modifying comprising:

using the second alignment vector as an initial first alignment vector, and

choosing the first alignment vector from a set of candidate alignment

vectors obtained by varying the initial first alignment vector; and

repeating the determining of the second alignment vector and the modifying of the first alignment vector until a particular stopping condition is met.

62. A method of performing registration of digitized images, the method comprising:

selecting a first area from each of a first image and a second image;

detecting a first set of features in the first area of the first image;

determining a second set of features consisting of the features from within the first set that include a first predetermined amount of information;

determining whether the second set of features is collectively sufficient to provide a meaningful comparison; and

determining, if the second set of features is deemed collectively sufficient, a transformation for the first area of the first image based on a comparison of the first area of the first image with areas of the second image.

63. The method of claim 62 wherein determining whether the second set of features is sufficient comprises determining whether the second set collectively includes a second predetermined amount of information.

64. The method of claim 62 wherein the first set of features includes a set of features that are oriented in a particular direction.

65. The method of claim 62 wherein the first set of features comprises edges in the

first area of the first image.

66. The method of claim 62 wherein:

the first areas of the first and second images include pixels, and

determining the transformation comprises:

determining which pixels in the first areas of the first and second images are feature pixels, and

weighting (a) a comparison of feature pixels in the first area of the first image with corresponding pixels in the first area of the second image differently than (b) a comparison of non-feature pixels in the first area of the first image with corresponding pixels in the first area of the second image.

67. The method of claim 62 wherein the images are based on digitized spectral separations.

68. The method of claim 67 wherein the spectral separations comprise color film separations.

69. A computer program for performing registration of digitized images, the computer program residing on a computer-readable medium and comprising instructions for causing a computer to perform operations including:

selecting a first area from each of a first image and a second image;

detecting a first set of features in the first area of the first image;

determining a second set of features consisting of the features from within the first set that include a first predetermined amount of information;

determining whether the second set of features is collectively sufficient to provide a meaningful comparison; and

determining, if the second set of features is deemed collectively sufficient, a transformation for the first area of the first image based on a comparison of the first area of the first image with areas of the second image.

70. An apparatus for performing registration of digitized images, the apparatus comprising one or more processors programmed to perform at least the following operations:

selecting a first area from each of a first image and a second image;

detecting a first set of features in the first area of the first image;

determining a second set of features consisting of the features from within the first set that include a first predetermined amount of information;

determining whether the second set of features is collectively sufficient to provide a meaningful comparison; and

determining, if the second set of features is deemed collectively sufficient, a transformation for the first area of the first image based on a comparison of the first area of the first image with areas of the second image.

71. A method of performing registration of digitized images, the method comprising:

selecting automatically a first area in each of a first image and a second image;

determining automatically a transformation for the first area in the first image based on a comparison of the first area of the first image with corresponding areas of the second image; and

applying automatically the transformation to the first area in the first image, wherein a film distortion is reduced.

72. The method of claim 71 wherein the first and second images are based on film separations.

73. The method of claim 72 wherein the film separations comprise color separations.

74. The method of claim 71 further comprising:

performing the method for a second area in the first image that is not isolated from the first area, wherein the two transformations are represented as alignment vectors that differ; and

applying a feathering technique to the first and second areas within a predetermined amount of the first and second areas in order to obtain new alignment vectors within the predetermined amount where the new alignment vectors are based on the first and second alignment vectors.

75. The method of claim 71 further comprising:

performing the method for multiple areas in the first image; and

determining the transformations for the multiple areas in an order of increasing

radial distance.

76. The method of claim 71 wherein determining the transformation comprises:

selecting automatically a feature in the first areas of the first and second images; and

using a feature-based measure to compare the first areas of the first and second images.

77. The method of claim 71 wherein determining the transformation comprises:

detecting automatically a feature in the first area of the first image;

eliminating automatically parts of the feature that do not contain a predetermined amount of information; and

determining whether parts of the feature that were not eliminated provide a basis for meaningful comparison.

78. The method of claim 77 wherein determining whether the parts not eliminated provide a basis for meaningful comparison comprises determining whether the parts not eliminated collectively contain a second predetermined amount of information.

79. The method of claim 77 wherein the feature comprises edges in the first area.

80. A computer program for performing registration of digitized images, the computer program residing on a computer-readable medium and comprising instructions

for causing a computer to perform operations including:

selecting automatically a first area in each of a first image and a second image;

determining automatically a transformation for the first area in the first image based on a comparison of the first area of the first image with corresponding areas of the second image; and

applying automatically the transformation to the first area in the first image, wherein a film distortion is reduced.

81. An apparatus for performing registration of digitized images, the apparatus comprising one or more processors programmed to perform at least the following operations:

selecting automatically a first area in each of a first image and a second image;

determining automatically a transformation for the first area in the first image based on a comparison of the first area of the first image with corresponding areas of the second image; and

applying automatically the transformation to the first area in the first image, wherein a film distortion is reduced.